REMARKS

The non-final Office Action dated May 1, 2007 is summarized as follows:

- The drawings are objected for failure to illustrate the actuator of claim 1 and the discrete amplitude generator of claim 7;
- Claims 1-2, 5-6 and 30-31 are rejected under 35 USC 103(a) as obvious over Wright (US 6313703) in view of Pengelly (US 2004/0113697), and claim 9 is rejected in further view of Porco (US 7,020,215);
- Claims 1, 5-7, 23, 29, and 34-37 are rejected under 35 USC 103(a) as obvious over Chethik (US 6593827) in view of Kornfeld (US 5974041);
- Claim 24 is rejected under 35 USC 103(a) as obvious over Chethik in view of Kornfeld and Porco;
- Claims 3-4 and 25-27 are rejected under 35 USC 103(a) as obvious over Chethik in view of Nguyen (US 6148040);
- Claims 12-17, 22 and 32-33 are rejected under 35 USC 103(a) as obvious over Hosur (US 2003/0152023) in view of Chethik and Kornfeld;
- Claims 18-19 and 28 are rejected under 35 USC 103(a) as obvious over Hosur in view of Chethik, Kornfeld and Nguyen;
- Claims 20-21 are rejected under 35 USC 103(a) as obvious over Hosur in view of Chethik, Kornfeld and Porco;
- Claims 10-11 are objected for their dependence from a rejected base claim but would be allowable if rewritten in independent form.

Drawings:

The discrete amplitude generator recited in claim 7 is illustrated as reference number 66 at Figures 4A-B as those drawing figures were originally filed; see paras [0023] to [0025]. Figures 4A-B are herein amended to illustrate the actuator described at [0008] and herein added to para [0023] as reference number 69. Both replacement and annotated drawing sheets are attached for each of Figures 4A-B. No new matter is added. This is seen to address the drawing objection as to claim 1.

The relevant prior art is summarized below.

Wright:

Against the claim 1 elements modulator and discrete amplitude amplifier is asserted Wright's digital compensation signal processor 21 and amplifiers 15, 16, with Pegnelly's teaching of unequal gate widths asserted to modify Wright's amplifiers 15, 16 to apply unique gains as compared to one another. Wright's amplifier's 15, 16 are not discrete; they operate in the analog domain (at passband/IF) immediately following RF upconversion 23, 24 per Wright's Figure 2 and col. 10 lines 42-55. Neither are these amplifiers constant envelope amplifiers as in claim 2; all cited references to this aspect refer to the Wright signal being a constant amplitude signal. Wright explicitly characterizes these amplifiers 15, 16 as non-linear at col. 7 lines 55 and col. 10 line 44. While the overall LINC amplifier 10 is linear (col. 7 lines 54-55), there is no staged or parallel implementation of the overall LINC amplifier.

The purported modification is seen to render the modified Wright LINC amplifier 10 inoperative. Equation 1 of Wright (col. 9 line 28) shows that the two baseband signals $Ph_A(t)$ and $Ph_B(t)$ form the overall signal $s(t)$, which Wright recombines at col. 10 lines 42-44 and 58-60 after amplification 15, 16 at passband to re-form an amplified version of the original signal $ks(t)=kPh_{ARF}(t)+ kPh_{BRF}(t)$. The amplifiers 15, 16 therefore apply the same gain k. If the amplifiers 15, 16 of Wright were adapted by Pegnelly to be discrete and of different gains, then in no instance could one create an amplified version of the original signal $s(t)$ except in the exceptional circumstance when the discrete amplifiers happen to exactly reflect the split of the original signal into its baseband components. The odds of this are vanishingly small when the amplifiers 15, 16 apply different gains as claim 1 recites. In the combination asserted in this rejection, the amplified signal combined from the modified amplifiers 15, 16 will be $k1Ph_{ARF}(t)+ k2Ph_{BRF}(t)$ [where k1 and k2 are the different gains] which no longer reflects Wright's original signal $s(t)$. Such differential gains overamplify one passband component and underamplify the other, and the signal arising from combining these as Wright does appears wholly unusable for Wright's feedback loop.

Wright does disclose at col. 9 lines 30-34 that the DCSP 21 inserts amplitude gains into each of the baseband signals $Ph_A(t)$ and $Ph_B(t)$, but these gains are to correct for errors introduced in the analog chains. As such the amplitude gains are fairly small and one skilled in the art

would not consider those amplifications to be analogous to a *power* synthesizer as claim 1 recites. Additionally, for reasons similar to that described above for Wright's power amplifiers 15, 16, the gain imposed in baseband at the Wright DCSP 21 on one signal component would not be unique as compared to that imposed on the other baseband signal component; they would be allowed to correct for the analog errors as Wright discloses, but since both passband signal components in the analog domain follow identical pathways any of these power adjustments will be identical or nearly so.

Respecting claim 6, the rejection appears to read "directly coupled" out of this claim. In the cited Wright Figure 2, there is no direct coupling between DCSP 21 and amplifiers 15, 16; there is between them a conversion from digital to analog and also a conversion from baseband to passband. One cannot modify Wright to meet claim 6 without extensive re-design to achieve power amplifiers that operate at baseband in the digital domain. It is notable that an embodiment of this invention could be imposed to make that modification to Wright and enable one to dispense with Wright's passband and analog conversions, enabling Wright to convert to analog nearer the transmit antenna and to convert directly to RF without the need for passband/IF processing. Absent these teachings though, it is not seen to be within ordinary skill.

Neither Pangelly nor Porco are seen to cure the above shortfalls of Wright. Claims 1-2, 5-6, 9 and 30-31 are seen to be patentable over the rejection.

<u>Chethik</u>:

Chethik teaches applying equal gains by at least three amplifiers, and dithering gain or phase of each in turn in a gain/phase adjustment circuit 14 for sequential calibration of each stage. Chethik is cited against independent claims 1 and 23.

First, claim 1 recites that the gain applied by each stage is unique as compared to all other stages; Chethik's amplifiers each apply equal gain, and any difference in amplification among the parallel stages 11 of Chethik is by the adjustment circuit 14, which operates only on one stage at a time (col. 3, lines 55-60 and col. 4, lines 4-18). Second, Chethik does not even

apply a different gain among the various stages; the only gain variance in Chethik is imposed in one stage, so all stages save one amplify with the same gain. Third, were one of ordinary skill to modify Chethik to combine its gain/phase adjustment circuit 14 with its high power amplifier HPA 13 in each stage, the result would not appear to be a discrete amplitude amplifier as in claim 1, but a continuously variable amplifier with gain continuous over Chethik's potential dither range, which is not discrete. Such a modification would also change Chethik's principle of operation, in that dithering would apparently not be confined to one stage at a time to efficiently drive error toward zero, but dither would be applied to all stages simultaneously. See Chethik, col. 4, lines 14-18 in view of col. 3, lines 55-60.

Method claim 23 recites that each bit of the bit stream which is separately applied to the various parallel inputs represents a different significance (e.g., most significant bit, least significant bit, as described in the written description at paragraph [0023]). Chethik uses a single keying bit to switch the modulators 12 on or off, and is not seen to base phase or gain dither in different stages on bits within the same bit stream of different significance. Instead, Chethik is seen to operate similarly on the entire bit stream in each of the parallel stages, with dither adjusted on each stage sequentially (col. 1 line 65 to col. 2, line 8).

Dependent claims 30-35 particularly recite, for each original independent claim, specific gain differentials among the various stages. Chethik is seen to teach away from these claims in that Chethik does not regularly space gain in each stage from gain in the other stages, but rather slightly dithers gain or phase in each stage separately to drive error to zero (col. 3, lines 49-58 and line 66 to col. 4, lines 3 and col. 4, lines 11-18).

Neither Kornfeld, Porco, nor Nguyen are seen to provide a basis to modify Chethik to overcome the above shortfalls. The purported modifications by Kornfeld are seen to substantially change Chethik's principle away from dithering to drive error to zero. Claims 1, 3-7, 23-27, 29, and 34-37 are seen to be patentable over the rejections.

Hosur:

The rejections over Hosur rely on Chethik for the power synthesizer element of independent

claim 12. By the above analysis, Chethik fails to teach or suggest that element. Claims 12-22, 28 and 32-33 are seen to be patentable over the rejections.

Claim amendments:

Transmitter claim 13 and all its dependent claims are changed in form. Method claim 23 is amended to recite discrete amplitude amplifiers. Added claims 38-41 follow the subject matter of claims 10-11. Other changes are for readability and to avoid in certain claims language that might be construed as means plus function. No new matter is added.

The Examiner is respectfully requested to review the cited art in view of the above detailed arguments. The Applicant thanks the Examiner for the indication of allowability for claims 10-11, but the above remarks make clear that broader subject matter of other claims is clearly distinguished over the cited art. The Examiner is requested to withdraw the rejections and pass claims 1-7 and 9-37 to issue. The undersigned representative welcomes the opportunity to resolve any matters that may remain, formal or otherwise, via teleconference at the Examiner's discretion.

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